

JAPANESE [JP,2004-315762,A]

---

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE  
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

---

[Translation done.]

**\* NOTICES \***

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

**[Detailed Description of the Invention]****[0001]****[Field of the Invention]**

This invention relates to the moisture powder type metalworking constituent which was excellent in the workability and the putrescibility-proof which are used for metal cutting, grinding, etc., and was moreover excellent in distributed stability, and its manufacture approach.

**[0002]****[Description of the Prior Art]**

Generally as constituents for processing, such as cutting of the former and a metal, grinding, and plastic working, they are mineral oil, fats and oils, soap, a defoaming agent, an extreme pressure agent, a surfactant, and anticorrosives. Antiseptics etc. are contained and the water-soluble processing oils diluted and used for water are used.

Since a life would fall, workability would also fall with an offensive odor, if the thing of putrescibility is contained in the component and it decomposes and these processing oils raised putrescibility-proof, they could not but cope with adding antiseptics as mentioned above etc. On the other hand, if antiseptics are used, in order to be anxious about the bad influence to the body, there is a problem that handling becomes difficult.

Then, the pursuit of the antiseptics with which there is little effect on the body and it raises putrescibility-proof has been performed by searching for what also has the effect few if possible on the body, and combining a specific amine by the specific ratio (for example, patent reference 1 reference).

**[0003]****[Patent reference 1]**

JP,5-279688,A (the 2-3rd page).

**[0004]**

However, the constituent for metalworking which does not use antiseptics needed to make the concentration at least 2 % of the weight or more, in order for there to be nothing and to have acquired workability, such as lubricity required as a metalworking agent constituent.

And when such a high-concentration water solution or suspension was used, it could not drain as it is after use, but there was also a problem of needing fixed processing.

**[0005]****[Problem(s) to be Solved by the Invention]**

Then, this invention makes it a technical problem to offer the metalworking agent constituent which does not need to use antiseptics, and is excellent in distributed stability, and can be used by low concentration, and its manufacture approach.

**[0006]****[Means for Solving the Problem]**

In order to solve the above-mentioned technical problem, it is invention of claim 1, Stratified compound (a) Organic metal salt (b) Or it is the moisture powder type metalworking agent

constituent which mixes at least one sort chosen from the group of an ultrafine particle (A) made from an inorganic metal salt (c), and at least one sort chosen from the group of a dispersant (B) which has a hydrophilic group, and it makes it come to distribute underwater,

Mean particle diameter of said ultrafine particle (A) is set to 1nm or more 1000nm or less,

Said stratified compound (a) contains a molybdenum sulfide, a sulfuration tungsten, zinc sulfide, a calcium carbonate, graphite, boron nitride, talc, a mica, a montmorillonite, a kaolinite, a melamine SHIANU rate, a titanic-acid magnesium potassium, and a lithium titanate potassium,

Said organic metal salt (b) contains a salt with a capric acid, a lauric acid, a myristic acid, a palmitic acid, stearin acid, oleic acid, linolic acid or a linolenic acid, calcium, magnesium, aluminum, zinc, or barium,

Said inorganic metal salt (c) is an implication about a calcium oxide, silicon oxide, titanium oxide, an aluminum oxide, and silicon nitride.

Said dispersant (B) Carboxymethylcellulose sodium, polyvinyl alcohol, A polycarboxylic acid mold giant-molecule surface active agent, the polyoxyethylene alkylphenol ether, A polyoxyethylene polyoxypropylene copolymer, the formalin condensate of naphthalenesulfonic acid soda, Ligninsulfonic acid soda, deformation poly carboxylate, polyethyleneimine, It is characterized by including an ethyleneoxide addition product, glycol ether, sulfates, an acrylic acid, the sodium salt of a maleic-acid copolymer, a polyoxyethylene sorbitan trio rate, dialkyl sulfo succinate, and an ester derivative.

[0007]

Since it combines also with a water molecule while metal workability is good, and the dispersant (B) which has a hydrophilic group has good compatibility with the ultrafine particle (A) which that hydrophilic group becomes from a layer structure compound (a), an organic metal salt (b), or an inorganic metal salt (c) and often sticking to that front face, since it has a lubricative good ultrafine particle according to this configuration, an ultrafine particle is distributed underwater stably. Moreover, when concentration of this dispersant (B) is made into 3 or less times of the concentration of an ultrafine particle (A), even if it does not use antiseptics, there is no possibility that putrefaction may occur.

[0008]

Invention of claim 2 is set to a moisture powder type metalworking agent constituent according to claim 1,

It is characterized by including any one or more sorts of an extreme pressure agent (C), a rusr-proofer (D), or the defoaming agent (E).

[0009]

Since what added the extreme pressure agent (C) reacts with a surface of metal and lowers frictional resistance, withstand-load ability goes up and its workability, such as cutting and grinding, also improves further.

The rust-proofing engine performance of what added the rusr-proofer (D) improves further.

Since what added the defoaming agent (E) reduces whippability further, the problem of the workability fall by overflow etc. cannot produce it easily.

[0010]

Invention of claim 3 is a moisture powder type metalworking agent constituent according to claim 1 or 2,

It is each about the concentration of said ultrafine particle (A) and a dispersant (B),

(Ultrafine-particle A): 50-2,000ppm,

Dispersant (B) : 50-6000 ppm

It is characterized by coming to carry out.

[0011]

Since the ultrafine particle (A) is contained according to this configuration and it has withstand-load ability required also of low concentration, the outstanding workability is acquired. And it excels in distributed stability according to an operation of a dispersant (B).

However, since withstand-load ability will be saturated if withstand-load ability sufficient in less than 50 ppm is not obtained but an ultrafine particle (A) exceeds 2000 ppm, it is not economical. Moreover, if

distributed stability falls and a dispersant (B) exceeds 6000 ppm in less than 50 ppm, putrescibility-proof will fall.

[0012]

invention according to claim 4 -- stratified compound (a) Organic metal salt (b) or the ultrafine particle material chosen from the group of an inorganic metal salt (c) -- the dispersant chosen from the group of a dispersant (B) which has one sort and a hydrophilic group even if few -- mixed process which mixes one sort and water and generates mixed liquor even if few,

It is the manufacture approach of the water-soluble metal agent constituent characterized by consisting of a grinding process which said mixed liquor is supplied in a wet pulverizer with a grinding medium, said ultrafine particle material is ground, and an ultrafine particle is distributed underwater, and generates the dispersion liquid of said ultrafine particle,

Said diameter of an ultrafine particle is characterized by selecting a grinding medium and grinding conditions so that 70% or more may be set to 1000nm or less.

[0013]

According to this configuration, in a mixed process, that by which the material of an ultrafine particle was mixed with the dispersant (B) which has a hydrophilic group underwater is easy overly to make it detailed to homogeneity in a grinding process by ultrafine-particle-being easy toize each material of an ultrafine particle, and selecting grinding conditions, such as a class of grinding medium, and magnitude, grinding time amount. Moreover, since it is uniform, when this is used for the moisture powder type metalworking agent constituent obtained by this manufacture approach, metal workability is much more good [ a constituent / 70% or more of the path of an ultrafine particle is 1000nm or less, it is overly detailed, and ].

[0014]

[Embodiment of the Invention]

The gestalt of operation of this invention is explained.

The mimetic diagram of the wet pulverizer which is an example of a medium mill which uses for manufacture of a moisture powder type metalworking agent constituent the mimetic diagram in which drawing 1 shows the basic configuration of a moisture powder type metalworking agent constituent, and drawing 2 , and drawing 3 are the explanatory views of a corrosion resistance trial.

[0015]

The gestalt of operation of the 1st of the moisture powder type metalworking agent constituent of this invention is the undiluted solution of a constituent. The undiluted solution of a constituent mixes and distributes the ultrafine particle 1 which grinds the material (henceforth ultrafine particle-sized material) of an ultrafine particle, and is obtained, and the dispersant 2 which has a hydrophilic group in water 3, as shown in drawing 1 .

[0016]

A lubricative good thing for which the ultrafine particle which grinds it and is obtained as ultrafine particle-sized material is used as a solid lubricant is chosen. For example, stratified compound (a) Organic metal salt (b) Or it is chosen from an inorganic metal salt (c) etc.

As a stratified compound (a), there are a molybdenum sulfide, a sulfuration tungsten, zinc sulfide, a calcium carbonate, graphite, boron nitride, talc, a mica, a montmorillonite, a kaolinite, a melamine SHIANU rate, a titanic-acid magnesium potassium, a lithium titanate potassium, etc.

Moreover, as an organic metal salt (b), there is a salt with a capric acid, a lauric acid, a myristic acid, a palmitic acid, stearin acid, oleic acid, linolic acid or a linolenic acid, calcium, magnesium, aluminum, zinc, or barium etc.

And as an inorganic metal salt (c), there are a calcium oxide, silicon oxide, titanium oxide, an aluminum oxide, silicon nitride, etc.

These ultrafine particle-sized material is ground and it considers as a with a 1nm or more mean particle diameter [ 1000nm or less ] ultrafine particle.

[0017]

Moreover, as a dispersant (B), it has a hydrophilic group, and it is easy to stick to the selected ultrafine

particle, and the good thing of putrescibility-proof is chosen. For example, carboxymethylcellulose sodium, polyvinyl alcohol, A polycarboxylic acid mold giant-molecule surface active agent, the polyoxyethylene alkylphenol ether, A polyoxyethylene polyoxypropylene copolymer, the formalin condensate of naphthalenesulfonic acid soda, Ligninsulfonic acid soda, deformation poly carboxylate, polyethyleneimine, There are an ethyleneoxide addition product, glycol ether, sulfates, an acrylic acid, sodium salt of a maleic-acid copolymer, a polyoxyethylene sorbitan trio rate, dialkyl sulfo succinate, an ester derivative, etc.

[0018]

Since an ultrafine particle 1 is adsorbed in hydroxyl-group 2a of a dispersant 2 and hydroxyl-group 2b interacts with the molecule of water 3 as shown in drawing 1, the moisture powder type metalworking agent constituent which distributed underwater at least one sort chosen from the group of the above-mentioned ultrafine particle-sized material and at least one sort chosen from the above-mentioned dispersant distributes an ultrafine particle 1 stably to homogeneity underwater. As for the mean particle diameter of an ultrafine particle, it is desirable that it is a small thing 1000nm or less. It is because distributed stability will fall if it exceeds 1000nm.

Moreover, as for the concentration of a dispersant (B), it is desirable that they are 3 or less times of the concentration of an ultrafine particle (A). If 3 times are exceeded, the period which causes pythogenesis and can be kept will become short.

[0019]

The gestalt of operation of the 2nd of this invention dilutes the above-mentioned undiluted solution with water, and is related with the diluent made into the concentration suitable for using it as lubricant of metalworking, such as cutting and grinding.

As for the concentration of an ultrafine particle, it is desirable to be referred to as 50-2000 ppm. Unless it fulfills 50 ppm, the value (although based also on the class of processing, when it is metal cutting, more than 7.0kg/cm<sup>2</sup> is \*\*\* better \*\*) of withstand-load ability required for processing is not acquired. Moreover, if it exceeds 2000 ppm, since the value of withstand-load ability will be saturated, it is uneconomical. Furthermore, it is desirable to be referred to as 200-1000 ppm.

[0020]

Furthermore, an extreme pressure agent, a rusr-proofer, or a defoaming agent may be added if needed. As an extreme pressure agent (C), sulfuration fatty acids, such as a thioether of the oleic acid in which water vitrification with one sort or two sorts or more of combination is possible and the RIMINORU acid of alkanolamine (monoisopropanolamine, diisopropanolamine, diethanolamine, triethanolamine, triethanolamine, tri-isopropanolamine), and its derivative, are desirable.

A desirable density range is 10 ppm - 1000 ppm.

Since an extreme pressure agent (C) reacts with a surface of metal and what added the extreme pressure agent (C) lowers frictional resistance Withstand-load ability goes up and workability, such as cutting and grinding, also improves further. Effectiveness will be saturated with less than 10%, if it is almost ineffective and exceeds 1000 ppm.

[0021]

As a rusr-proofer (D), an amine salt or mineral salt, such as fatty acids, such as an oleic acid neo decanoic acid, dodecane diacid, and sebacic acid, and 5-friend no 1-H-tetrazole, and an alkenyl succinic acid, etc. are desirable. A desirable density range is 1000 ppm - 20000 ppm. The rust-proofing engine performance of what added the rusr-proofer (D) improves further. Effectiveness will be saturated with less than 1000 ppm, if effectiveness is scarce and exceeds 20000 ppm.

[0022]

As a defoaming agent (E), a silicone system defoaming agent, an alcoholic system defoaming agent, etc. are desirable. A desirable density range is 10 ppm - 500 ppm.

Since what added the defoaming agent (E) reduces whippability further, the problem of the workability fall by overflow etc. cannot produce it easily. Effectiveness will be saturated with less than 10 ppm, if effectiveness is scarce and exceeds 500 ppm.

[0023]

Next, an example of the manufacture approach of the undiluted solution of this moisture powder type metalworking agent constituent is explained.

first, the ultrafine particle-sized material chosen from the group of a stratified compound (a) and organic metal salt (b) or an inorganic metal salt (c) -- one or more sorts, one or more sorts chosen from the group of a dispersant (B) which has a hydrophilic group, and water are mixed within a container, and it considers as a slurry (mixed process).

Next, while grinding the ultrafine particle-sized material in this slurry and considering as an ultrafine particle (A) using the medium mill 10 shown in drawing 2, a dispersant (B) is made to stick to that front face, and it is made to distribute underwater to homogeneity (grinding process).

[0024]

The medium mill 10 consists of a drive and a control section 20 which holds and controls [ drive and ] the grinding section 11 and this. The grinding section 11 is equipped with Rota 12 which is rotated and is controlled by a drive and the control section 20, the dynamic screen 14 in which it was prepared in the wrap bessel 13 and Rota, and the electrode holder 15 holding this. Barriers 12a and 13a are formed in the periphery of Rota 12, and the inner circumference of bessel 13.

[0025]

In grinding, the bead which is not illustrated beforehand is put in between this Rota 12 and bessel 13. And the grinding section 11 is supplied from a supply pipe P1 with the pump which does not illustrate Slurry La. Rotation of Rota 12 passes the slit formed of Barriers 12a and 13b, Slurry La being stirred with a bead in the space formed between Rota 12 and bessel 13 with the bead into which it was put beforehand. And the ultrafine particle-sized material in a slurry serves as an ultrafine particle (A) between them. The slurry La from which the ultrafine particle-sized material became an ultrafine particle (A) permeates in the dynamic screen 14, and is outputted as an undiluted solution of the moisture powder type metalworking agent constituent L through discharge hole 15a of an electrode holder 15, and an exhaust pipe P2. Under the present circumstances, since a bead is prevented by the dynamic screen, it is held in bessel 13.

[0026]

As a bead, a 0.2mm - 0.3mm thing has a desirable diameter.

Moreover, the filling factor, i.e., the filling factor of a bead to the bessel 13 of the grinding section and the volume of the space formed between Rota 12, has 60 - 70 desirable%. Rotational speed of Rota 12 is made into the peripheral speed of 9-15m/s, and, as for the rate of flow of a slurry, considering as 50 - 100 L/h is desirable. And as for distributed time amount, i.e., time amount until an ultrafine particle is made from grinding initiation of ultrafine particle-sized material, it is desirable to be referred to as 10-30h.

[0027]

Next, based on an example and the example of a comparison, this invention is further explained to a detail.

Evaluation of the presentation of the example concerning [ Table 1 ] the undiluted solution of a moisture powder type metalworking agent constituent, the mean particle diameter of an ultrafine particle, and its distributed stability and Table 2 - 4 show evaluation of withstand-load ability, distributed stability, fizz, putrescibility-proof, and corrosion resistance to the presentation list of the diluent which diluted it to predetermined concentration.

Moreover, Table 5 is the presentation of the water-soluble metalworking agent constituent of the example of a comparison, the mean particle diameter of an ultrafine particle, concentration, and its characterization.

[0028]

[Table 1]

		実施例											
超 微 粒 子	材 質	1	2	3	4	5	6	7	8	9	10	11	12
	グラファイト(%)	10					5	5	5	5	10	10	10
	雲母(%)	10					5						
	硫化Mn(%)		10										
	ステアリン酸亜鉛(%)			10					5				
	酸化ケイ素(%)				10					5			
平均粒径 (nm)		100	200	50	200	6	150	150	50	100	100	500	1000
分 散 剤	カルボキシメルセルロースナトリウム(%)	3	7		3	3	3	3	3	3	3	3	3
	ポリビニルアルコール(%)			6.7									
	ポリカルボン酸型高分子界面活性剤(%)	17	13		17	17	17	17	17	25	7	17	17
	ポリオキシエチレナルフェノールエーテル(%)			3.3									
	ポリオキシエチレノリオキシプロピレン共重合体(%)									10			
	水		残	残	残	残	残	残	残	残	残	残	残
	分散安定性試験	A	A	A	A	A	A	A	A	A	A	A	A

[0029]  
[Table 2]

実施例		13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
超微粒子及び分散剤		実施例 1 に同じ																	
		実施例 2 (に同じ)								実施例 3 に同じ								実施例 4 (に同じ)	
添加剤	濃度(ppm)	50	100	500	1000	2000	5000	1000	2000	1000	2000	1000	2000	1000	2000	1000	2000	1000	2000
超微粒子	極圧剤(ppm)																		
	防錆剤(ppm)																		
	消泡剤(ppm)																		
水	残	残	残	残	残	残	残	残	残	残	残	残	残	残	残	残	残	残	残
耐荷重能 (kg/cm <sup>2</sup> )	7.0	8.0	9.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	11.0	11.0	11.0
分離安定性試験	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
発泡性試験	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	A	A	A
耐腐敗試験	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
耐腐食試験	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
気相部	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
界面部	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	A	A	A
液中部	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	A	A	A

[0030]  
[Table 3]

実施例		31	32	33	34	35	36	37	38	39	40	41	42	43	44				
超微粒子及び分散剤		実施例 6 に同じ						実施例 7 に同じ						実施例 8 に同じ		実施例 9 に同じ		実施例 10 に同じ	
超微粒子濃度(ppm)	1000	2000	1000	2000	1000	2000	1000	2000	1000	2000	1000	2000	1000	2000	1000	2000	1000	2000	
添加剤	極圧剤(ppm)																		
	防錆剤(ppm)																		
	消泡剤(ppm)																		
水	残	残	残	残	残	残	残	50	50	50	50	50	50	50	50	50	50		
耐荷重能(kg/cm <sup>2</sup> )	12.0	12.0	13.0	13.0	13.0	13.0	13.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		
分離安定性試験	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
発泡性試験	A	A	B	B	A	A	A	A	A	A	A	A	C	C	B	B	B		
耐腐食試験	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
耐腐食試験	気相部	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
	界面部	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
	液中部	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		

[0031]  
[Table 4]

実施例		45	46	47	48	49	50	51	52	53
超微粒子及び分散剤		実施例 1 に同じ						実施例 11 に同じ		
添加剤	超微粒子濃度(ppm)	1000	1000	1000	1000	1000	1000	1000	1000	1000
	極圧剤(ppm)	10	100	100	1000	1000	2000	2000		
	防錆剤(ppm)									
	消泡剤(ppm)				50		500	1000		
	水	残	残	残	残	残	残	残	残	残
	耐荷重能(kg/cm <sup>2</sup> )	11.0	13.0	13.0	15.0	15.0	15.0	15.0	10.0	10.0
	分離安定性試験	A	A	A	A	A	A	A	A	A
	発泡性試験	A	B	A	C	A	C	B	A	A
	耐腐敗試験	A	A	A	A	A	A	A	A	A
耐腐食試験	気相部	A	A	A	A	A	A	A	A	A
	界面部	A	A	A	A	A	A	A	A	A
	液中部	A	A	A	A	A	A	A	A	A

[0032]  
[Table 5]

比較例		1	2	3	4	5	6	7	8	9	10
超微粒子及び分散剤		実施例 1 に同じ		実施例 3 に同じ		実施例 4 に同じ					
平均粒径 (nm)		2000	100	100	50	200					
超微粒子濃度 (ppm)		100000	1000	40	1000	1000					
分散剤 (ppm)	カルボキシメチルセルロースナトリウム	30000	50000	30000		30000					
	ボリビニルアルコール				67000						
	ポリカルボン酸型高分子界面活性剤	170000	300000	170000		170000					
	ポリオキシエチレングリコールエーテル				33000						
添加剤 (ppm)	極圧剤										
	防錆剤			500							
	消泡剤					3					
市販切削剤濃度 (ppm) <sup>1)</sup>							1000	2000	20000	50000	100000
水		残	残	残	残	残	残	残	残	残	残
耐荷重能 (kg/cm <sup>2</sup> )		—	10.0	6.0	9.0	11.0	1.5	2.5	10.0	12.0	12.0
分離安定性試験		B	A	A	A	A	A	A	A	A	A
発泡性試験		—	A	A	A	B	C	C	C	C	C
耐腐敗試験		—	B	A	A	A	A	A	A	A	A
耐腐食試 験	気相部	A	A	A	A	A	A	A	A	A	A
	界面部	A	A	A	B	A	A	A	A	A	A
	液中部	A	A	A	B	A	A	A	A	A	A

1)推奨濃度: 20000~100000ppm

[0033]

The approach of evaluation is as follows.

(1) Distributed stability

100ml of test fluid was put into glassware, it observed at -5 degrees C, and the appearance was observed for the thermo cycle of 12 hours after 10 cycle \*\*\*\*\* at 20 degrees C for 12 hours.

A criterion is carried out as follows.

A ... Thing without separation and change of a hue

B ... What separation and precipitate generated

[0034]

(2) Withstand-load ability

The withstand-load ability (oil film disruptive strength) of test fluid was measured by \*\*\*\* type walk trial.

specifically it considered as rotational-speed per minute 200 rotation, and for 1 minute, 0.5kg was minced, it came out after pressurization, by 0.5kg using the walk form friction tester by Shinko Engineering Co., Ltd., and the load was increased, it is the step method to pressurize every [ during 1 minute ], respectively, and the pressure when printing occurs and rotation stops was measured.

Especially a criterion is 7kg/cm<sup>2</sup> although not specified. The above is desirable.

[0035]

(3) Fizz

A glass tube is filled with 150ml test fluid, and the oil level in a glass tube is made to inject and circulate through the tube prolonged from the lower limit of a glass tube from the tube fixed to glass tube upper limit through through and a liquid-sending pump. The flow rate with a liquid-sending pump was considered as a part for 360ml/, and measured extent of foaming in the glass tube of 60 seconds after. The criterion is as follows.

A\*\*\*\*\*2.5 cm (pure water and this level),

Less than B\*\*\*\*\*10 cm

C\*\*\*\*\*10 cm or more

[0036]

(4) Putrescibility-proof

After having added 2g of corn powder, and 10g of cast iron chips to 50ml of test fluid, covering the container and leaving it for five days at 37.8 degrees C, the number of micro organisms in 1ml was measured.

The criterion is as follows.

A ... Number of micro organisms 104 Under individual

B ... Number of micro organisms 104 More than individual

[0037]

(5) Corrosion resistance

As shown in drawing 3 , one half immersion of the test piece S of a rolled plate was carried out into [ test fluid L50ml ] 40 degrees C, and extent of discoloration of the gaseous-phase section Sa of 2 hours after, the interface section Sb, and liquid CHUBU ENGINEERING CORPORATION Sc was observed visually.

The criterion is as follows.

A ... Discoloration is not seen.

B ... Discoloration is seen.

[0038]

<Examples 1-12>

The examples 1-12 of Table 1 summarize the presentation of the undiluted solution of a moisture powder type metalworking agent constituent, and evaluation of distributed stability.

As for the example 1 of a comparison of Table 5, the judgment of distributed stability is B to each of these being [ the judgment of distributed stability ] A. To mean particle diameter of an example being

1000nm or less, although ultrafine particle-sized material and the dispersant of the example 1 of a comparison are the same as that of an example 1, since the mean particle diameter of an ultrafine particle is as large as 2000nm, distributed stability is considered to be a not good thing.

[0039]

<Examples 13-53>

Using either of the examples 1-12, the examples 13-53 of Table 2 - 4 add additives, such as an extreme pressure agent, a rusr-proofer, and a defoaming agent, remaining as it is or if needed, and dilute them to predetermined concentration. In addition, as an extreme pressure agent, it is Dainippon Ink DAILUBE which is a sulfuration fatty acid. As the TEA salt of GS550, and a rusr-proofer, they are the TEA salt of dodecane diacid, and Dow Corning Toray Silicone SH5507 which is a silicone system as a defoaming agent. EMUL was used.

For each of these, withstand-load ability is 7kg/cm<sup>2</sup>. It was above and each judgment of distributed stability was A. The example shows that all are excellent in these two basic properties. On the other hand, at the example 3 of a comparison, although ultrafine particle-sized material and a dispersant are the same as an example 1, withstand-load ability is 6kg/cm<sup>2</sup>. The concentration of an ultrafine particle is considered because low one is as low as 40 ppm.

[0040]

Although ultrafine particle-sized material and the dispersant also of the example 2 of a comparison are the same as that of \*\*\*\*\* 1, the judgment of putrescibility-proof is B. As for this, the concentration of a dispersant is considered because many as compared with the example 3 of a comparison.

[0041]

Corrosion resistance is inferior, although the presentation of the example 4 of a comparison is the same as that of an example 23 except the concentration of a rusr-proofer and it is satisfactory in a basic property.

[0042]

The example 5 of a comparison is the same as an example 27 except the concentration of a defoaming agent, and although it is satisfactory in a basic property, fizz is a little high (antifoam is bad).

[0043]

The examples 6 and 7 of a comparison are all the conventional commercial cutting fluids. That is, in the conventional commercial cutting fluid which does not use the ultrafine particle, in 2000 ppm or less, withstand-load ability is low, and concentration of cutting ability is bad. Therefore, like the examples 8-10 of a comparison, if it is not made 20000 ppm or more, it is impractical. If concentration is high, the inconvenience of being unable to drain as it is will arise.

Moreover, there is fizz and problems, such as a workability fall, may be produced.

[0044]

In the comparison between examples whose ultrafine particle and dispersant are satisfying the fundamental requirements for this invention, by having added the rusr-proofer, examples 23 and 24 are compared with examples 21 and 22 and its corrosion resistance of the interface section and liquid CHUBU ENGINEERING CORPORATION is improving to consider an operation of an additive.

Moreover, examples 27 and 28 have improved antifoam by having added the defoaming agent compared with examples 25 and 26. The same thing can be said also in the contrast with examples 33 and 34 and examples 35 and 36 and contrast with examples 41 and 42 and examples 43 and 44, contrast of an example 46 and an example 47, contrast of an example 48 and an example 49, and contrast of an example 50 and an example 51.

[0045]

Next, in examples 45-51, it turns out that withstand-load ability also improves as the addition of an extreme pressure agent increases.

[0046]

In the examples 13-18 as an example 1 with same ultrafine particle-sized material and dispersant, if the concentration of an ultrafine particle is set to 1000 ppm or more, withstand-load ability will not change.

[0047]

[Effect of the Invention] As stated above, since the moisture powder type metalworking agent constituent of this invention contains the ultrafine particle (A) excellent in lubricity, it is excellent in metal workability. Moreover, since it combines also with a water molecule and the dispersant (B) which has a hydrophilic group distributes an ultrafine particle underwater stably while compatibility with an ultrafine particle (A) is good and often sticks to the front face, it can be kept at a long period of time. When concentration of a dispersant (B) is made into 3 or less times of the concentration of an ultrafine particle (A), even if it does not use antiseptics, there is no rotten fear.

[0048]

Moreover, if an extreme pressure agent (C) is added, since it will react with a surface of metal and frictional resistance will be lowered, withstand-load ability goes up and workability, such as cutting and grinding, improves further.

Addition of a rust-proofer (D) raises the rust-proofing engine performance further.

If a defoaming agent (E) is added, since whippability will be reduced further, workability, such as cutting and grinding, improves further.

[0049]

Furthermore, since the workability which has required withstand-load ability, is moreover excellent in distributed stability, and was excellent also in low concentration since the ultrafine particle (A) was contained is acquired, it is economical.

However, withstand-load ability with an ultrafine particle sufficient by less than 50 ppm is not obtained, but if it exceeds 2000 ppm, withstand-load ability will be saturated. Moreover, if distributed stability falls and a dispersant exceeds 6000 ppm in less than 50 ppm, putrescibility-proof will fall.

[0050]

And according to the manufacture approach of the moisture powder type metalworking agent constituent of this invention, it is,

It is easy for homogeneity overly to make it detailed by being the material which atomization material (A) tends to grind, and selecting the class and magnitude of a grinding medium, and selecting grinding conditions, such as grinding time amount. Moreover, since it is uniform, when this is used for the moisture powder type metalworking agent constituent obtained by this manufacture approach, metal workability is much more good [ a constituent / 70% or more of the path of an ultrafine particle is 1000nm or less, it is detailed, and ].

[Brief Description of the Drawings]

[Drawing 1] It is the mimetic diagram showing the basic configuration of a moisture powder type metalworking agent constituent.

[Drawing 2] It is the mimetic diagram of the wet pulverizer which is an example of the medium mill used for manufacture of a moisture powder type metalworking agent constituent.

[Drawing 3] It is the explanatory view of a corrosion resistance trial.

[Description of Notations]

1 Ultrafine Particle

2 Dispersant

3 Water

10 Medium Mill

11 Grinding Section

12 Rota

12a Barrier

13 Bessel

13a Barrier

14 Dynamic Screen

15 Electrode Holder

20 Drive and Control Section

L Moisture powder type metalworking agent constituent

La Slurry

---

[Translation done.]